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UNITED STATES DEPARTMENT OF COMMERCE

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PD

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.
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09/371,955 08/11/99 LEIPHART

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MMC2/0518

EXAMINER

KANG, D

ART UNIT

PAPER NUMBER

2811

DATE MAILED:

05/18/01

Please find below and/or attached an Office communication concerning this application or proceeding.

Commissioner of Patents and Trad marks

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Office Action Summary

Application No.

09/371,955

Applicant(s)

LEIPHART, SHANE P.

Examiner

Donghee Kang

Art Unit

2811

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136 (a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 30 March 2001.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 26-40 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 26-40 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claims _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are objected to by the Examiner.
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. § 119

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgement is made of a claim for domestic priority under 35 U.S.C. § 119(e).

Attachment(s)

- 15) ☒ Notice of References Cited (PTO-892)
- 16) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 17) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 2.
- 18) ☐ Interview Summary (PTO-413) Paper No(s). _____.
- 19) ☐ Notice of Informal Patent Application (PTO-152)
- 20) ☐ Other:

DETAILED ACTION

Acknowledgement

1. Applicant's Amendment has been entered and made of record.

Claim Rejections - 35 USC § 103

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

3. Claims **26-32 & 37-40** are rejected under 35 U.S.C. 103(a) as being unpatentable over Harada et al (US 5,313,101) in view of Kanamori (US 5,281,850).

Regarding claims **26-32**, Harada et al discloses a semiconductor device comprising (Fig.2G):

a memory circuit region in a semiconductor substrate; a first dielectric layer (3); an aluminum layer (4) over the dielectric layer; a contact interconnect between the aluminum layer (4) and substrate (1); a second dielectric layer (5) on the aluminum layer; a via hole extending through the second dielectric layer to aluminum layer; a titanium aluminide layer (206) lining at least a bottom of the via hole; a titanium compound layer (102) formed on the titanium aluminide; a conductive material (103') formed on the titanium nitride layer; and a second metallic layer (103) on the second dielectric layer and electrically connected to the plug material.

Harada et al does not teach an antireflecting coating layer over the aluminum layer.

However, Kanamori teaches in Fig.1(f) the antireflecting coating layer (5) located at between aluminum layer and second dielectric layer. It is common to use a layer of material to suppress reflections from underlying surfaces during photolithography exposure steps. Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to form the antireflecting coating layer, since antireflecting coating layer suppresses reflections from underlying layers so that the photoresist is not exposed to the reflected light wave which leads to variation in critical dimensions.

Regarding claims **37-40**, Harada et al discloses a semiconductor device comprising (Fig.2G):

a memory circuit region in a semiconductor substrate; a first dielectric layer (3) over the memory circuit region; a first metallic layer (4) over the first dielectric layer; a contact interconnect between the first metallic layer (4) and the substrate (1); a second dielectric layer (5) on the first metallic (aluminum) layer; a via hole extending through the second dielectric layer to a surface of the second metallic layer; a titanium aluminide layer (206) lining at least a bottom of the via hole; a titanium compound layer (102) formed on the titanium aluminide; a conductive material (103') formed on the titanium compound layer; and a second metallic layer (103) on the second dielectric layer and electrically connected to the plug material.

Harada et al does not teach an antireflecting coating over the aluminum layer.

However, Kanamori teaches in Fig.1(f) the antireflecting coating layer (5) located at between aluminum layer and second dielectric layer. It is common to use a layer of

material to suppress reflections from underlying surfaces during photolithography exposure steps. Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to form the antireflecting coating layer, since antireflecting coating layer suppresses reflections from underlying layers so that the photoresist is not exposed to the reflected light wave which leads to variation in critical dimensions.

Neither Harada et al nor Kanamori teaches a computer system in which comprises a semiconductor device as teaching by Harada et al as modified by Kanamori. It would have been obvious to one of ordinary skill in the art to have a processor in computer system since a RAM fabricated on a semiconductor chip communicates with the processor while computer is operating.

4. Claims **33-36** are rejected under 35 U.S.C. 103(a) as being unpatentable over Harada et al in view of Kanamori, as applied claim **28** above, and further in view of Clayton (US 4,656,605).

Regarding claims **33-36**, Harada et al as modified by Kanamori teaches all claimed invention, as applied claim 28 above, except for a memory module which include a semiconductor device.

However, Clayton teaches the memory module comprising (Fig.2):

a substrate comprising a circuit board (31); a plurality of memory chips (10-18) mounted on the substrate and connected to form a memory circuit, wherein one or more of the memory chips comprises a random access memory (RAM) fabricated on a

semiconductor substrate which comprising the teaching of Harada; and an edge connector (20) along one edge of the substrate which is wired to said memory circuit.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to have module system in order to complete the semiconductor memory device.

Response to Arguments

5. Applicant's arguments with respect to claims 26-40 have been considered but are moot in view of the new ground(s) of rejection.

Conclusion

6. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

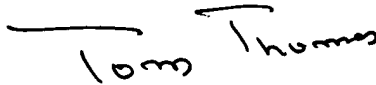
A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

7. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Donghee Kang whose telephone number is 703-305-9147. The examiner can normally be reached on Monday through Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Tom Thomas can be reached on 703-308-2772. The fax phone numbers for the organization where this application or proceeding is assigned are 703-308-7722 for regular communications and 703-308-7722 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-308-0956.

Donghee Kang, Ph.D
May 16, 2001


TOM THOMAS
SUPERVISORY PATENT EXAMINER